

Water Quality Analysis of Aksu-Tarim River Based on Remote Sensing Data

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1.Introduction

Based on remote sensing techniques, various methods have been proposed to detect parameters of water quality, monitor their changes and estimate water pollution(Wang Yun-peng,etl.2001). A well-known conclusion is that, to some extent, water pollution can in fact be detected by remotely sensed image analysis. Combining these images with ground truth observations at the same time, a model can be established to quantitatively monitor water pollution.

Wang et al.(2001) employed TM data and limited on-site data to develop a model for predicting 7 kinds of water quality parameters in Tai Hu, namely(SS、SD、COD、BOD₅、TN、TP、DO), This model demonstrates that using single-band and multi-band data factor analysis and PCA can make full use of remotely sensed information and improve the accuracy of prediction(Wang Xue-jun,etl.2000).Yunpen Wang,Hao Xia, et al. used Landsat TM data to analyze the changes of water quality in Shenzhen(Wang Yun-peng,etl.2004). Wang and Ma used remote sensing techniques to monitor and assess the water quality of Tai Hu(X.J.Wang,etl.2001). Yin,Walcott, et al.(2005) analyzed the relationship between water pollution changes and city development in Shanghai. Hellwegeer,Schlosser, et al.(2004) used satellite images to study the water quality of the port in New York.Wan, et al.(2003) employed high spectrum remote sensing to monitor water environment and developed regression models of COD and BOD₅.Wu and Li(1997) used PPR to simulate the water quality of the rivers in the Tarim Basin.Lu(2002) used Landsat TM satellite data to study the water pollution of the Yangtze River around Nanjing.The Remote Sensing Centre of Sichuan Province used TM data to survey the water pollution in the three rivers of Cheng Du, and the classified water pollution into 5 grades, which became the basis to improve the water system around Cheng Du(Diao Shu-juan,etl.2001).

The study area of this paper is the river of the Aksu-Tarim Basin. How to use TM data and routine monitoring data to monitor water quality are discussed. A water quality-monitoring model is proposed.

2. Study Area

As shown in Fig.1, Aksu lies in the middle part of the South Xinjiang Autonomous Region, at the southern foot of Tian Shan Mountains, the northern fringe of Tarim Basin. The range of its geographic coordinates are $78^{\circ}02' \sim 84^{\circ}07'E, 39^{\circ}30' \sim 42^{\circ}40'N$. It is respectively adjacent to Bayinguoleng in the east, Kazakhstan in the northwest, Takelamagan in the south and Ili in the north. It is about 510 kilometers from east to west, 350 kilometers from north and south. Its area is $132,500\text{km}^2$, accounting for 1.38% of the area of China.

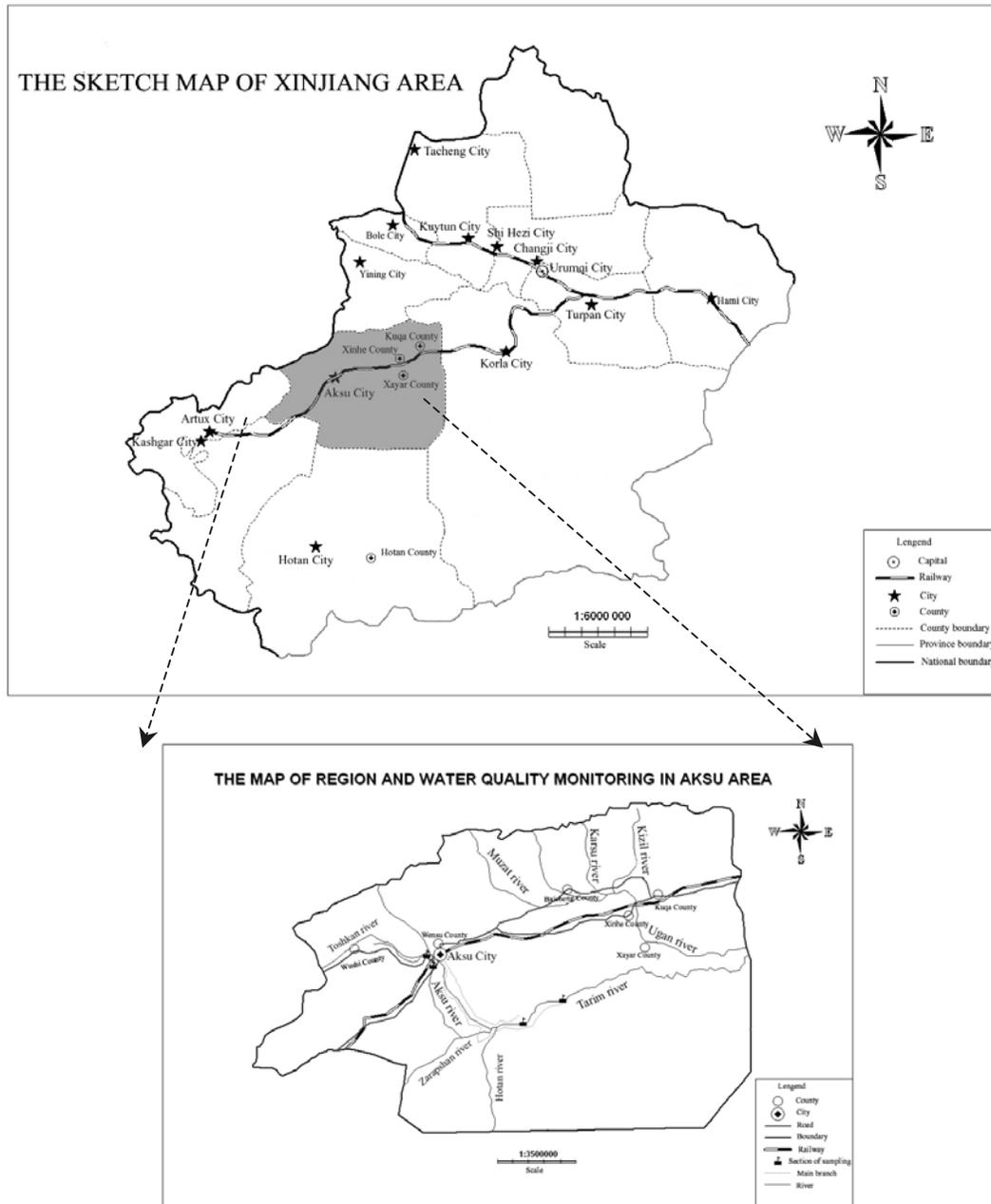


Fig.1 The map of study area

In recent years, along with the economic development of the drainage area, intensive

and exploitation of upstream areas has occurred. The amount of incoming water has been gradually reduced in the midstream and downstream segment of the Tarim River(JI Fang, et al.2000).At the same time, the amount of highly-mineralized water directly draining into this river has increased. Water pollution has become seriously(MA Ying-jie, et al. 1999).Especially since the 1970 year, with increased human activities, Water consumption dramatically increased in the middle segment. The volume of salt aggregation is large in the Accra River valley. The improvement of removing salt and meliorating soil further increase the degree of mineralization of this river and blocks the agriculture development along the river of Tarim Basin. The amount is of chlorides, sulphates and mineralization exceed standard levels, which prove that water pollution in the Tarim Basin is mainly due to the salinization of soil.

According to monitoring data from 1985 through 1998, the rates of mineralization in Allard,Xinquman and Kalanian are respectively 1.85g/L,1.37g/L and 1.34g/L.they document that the mineralization rate increases with the increase of the flow, that the mineralization rate is low upstream, and a high in downstream. The reason is that the upstream absorbs a large amount of farmland water. Therefore, in order to improve water quality, drainage from farmland to the river must be restricted.

However, development of the economy must boost the drainage from farmland the Aksu-Tarim valley. In order to fulfill sustainable development in agriculture, it is necessary to the change farmland drainage and their adequate influence on Aksu-Tarim valley. Therefore, remote sensing techniques are employed in this area. Because it is a advanced techniques in nowadays.

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Biography

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